

control is coupled to a user-interface. The user interface is an array scroller responsive to user actuation of the force-sensitive interface, the user actuation being a magnitude of force applied to the force-sensitive interface; a scrolling speed of the array scroller is controlled by the magnitude of the force applied. A helper character generator is actuated by continued user actuation of the array scroller. The helper character generator is operative to render a helper indication representative of a portion of the list being scrolled.

**[0012]** In another embodiment according to the present invention, in a data processing environment, there is a method for enabling a user to scroll through an ordered list in a data array accessible through a data processing device. The method comprises enabling the user to scroll through the list at a predetermined rate, in response to the user actuating the data processing device via a force-sensitive interface. The predetermined rate is proportional to the magnitude of the force the user exerts on the force-sensitive interface. A helper character representative of a portion of the list being scrolled is generated.

**[0013]** The above summaries of the present invention are not intended to represent each disclosed embodiment, or every aspect, of the present invention. Other aspects and example embodiments are provided in the figures and the detailed description that follows

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0014]** The invention may be more completely understood in consideration of the following detailed description of various embodiments of the invention in connection with the accompanying drawings, in which:

**[0015]** **FIG. 1** outlines the process of selecting an item on a list according to an embodiment of the present invention;

**[0016]** **FIG. 2** depicts the process of **FIG. 1** as applied to an example user-interface; and

**[0017]** **FIG. 3** depicts an example embodiment according to the present invention as is implemented in a handheld device.

**[0018]** While the invention is susceptible to various modifications and alternative forms, specific embodiments thereof have been shown by way of example in the drawings and will herein be described in detail.

#### DETAILED DESCRIPTION

**[0019]** The present invention has been found to be useful and advantageous in connection with increasing the efficiency and ease-of-use in a device, application, or service built with and designed to utilize minimal computing resources. This may include small displays found on, e.g., personal digital assistants (PDAs), telephone handsets, MP3 players, global positioning receivers (GPS), and automobile dashboard displays. Space constraints of these devices may limit the number of buttons and their functionality to control these small displays. This may also include network services of a distributed computing environment such as the World Wide Web. The maximizing of efficiency by using the invention provides the user more convenience in reducing bandwidth requirements of the network in searching for and retrieving of information. Moving less data back and forth across the network saves time. Further information about

graphical user interfaces (GUI) employed by the aforementioned devices may be found in a patent application titled, "Hand-Held with Auto-Zoom for Graphical Display of Web Page, Ser. No. 09/619,426 (attorney docket US 000173) filed Jul. 19, 2000, incorporated by reference in its entirety herein.

**[0020]** Further information about a GUI that enables the user to negotiate data from a long sorted list may be found in a patent application titled, "Rapid Retrieval User Interface Designed Around Small Displays and Few Buttons for Searching Long Sorted Lists," Ser. No. 09/780,229 (attorney docket US 018001) filed Feb. 9, 2001, incorporated by reference in its entirety herein.

**[0021]** Within the context of the invention, a user selects an item from an ordered list, such as a file list from a computer, a name from a telephone directory, or a town name from a database. In an example application, the user is typically presented with a scrollable list on the display, with the ability to scroll the list and the ability to select an item on the list.

**[0022]** The ability to scroll through a large ordered list may be facilitated by the UI having a control that provides a tactile resistance to the user e.g., in proportion to the displacement applied. Such a control may comprise a spring-loaded jog/shuttle knob. The scrolling speed is determined by how many degrees the knob is rotated. The direction of the scrolling is determined by whether the knob is rotated clockwise or counter-clockwise. Other devices similar to the jog-shuttle knob may include joysticks and scroll wheels. Additionally, pressure-sensitive devices such as touch pads on laptop PCs or drawing tablets may enable the user to scroll through a large list. The speed of the scrolling is proportional to the pressure applied.

**[0023]** When faced with a long list of items and a small display, it is often difficult to scroll through the list. If the screen is small, items do not stay on the screen for a very long time. Scrolling, therefore, needs to be done slowly, to allow the eye/brain to see the item for long enough to read it. On a large screen this is less of a problem, as the eye can track an item as it scrolls across the screen.

**[0024]** For a long list, it is desirable to scroll fast; otherwise the time taken to access the desired element in the list is annoyingly long. However, fast scrolling is in conflict with the previous point. The usability of a number of devices is constrained by the retrieval of data from a long list. For example, in a cellular phone (for the user's address book), these devices may have, or may have access to, address books hundreds of entries in length. Scrolling through the entries to select a number to dial is most desirable, as it can be done with just the thumb of one hand. In a PDA, databases such as the address book or other databases may be hundreds or thousands of entries in length. Also, portable audio jukeboxes—and MP3 players can now hold many tracks of music on an internal hard disk or solid state memory, but the unit itself is no larger than a traditional portable CD player. Typically as a cost and size saving the UI is via a display a few lines long and three or four buttons.

**[0025]** In a conventional UI, when the user starts to scroll through a long list, the scroll rate increases after a few seconds of holding down the scroll key. Entries in the list then scroll by at a rate that is almost impossible to read, particularly on a small screen